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LAWRENCE Z. LORBER
R. STUART BROOM
ROBERT G. VARNER, JR.
KENNETH S. BARRSUITE 700
901-15TH STREET, N.W.
WASHINGTON, D.C. 20005-2301

(202) 371-6000

TELEX: 1561792 VERLIP UT

TELECOPIER: (202) 371-6279

HOUSTON OFFICE

6901 TEXAS COMMERCE TOWER
600 TRAVIS
HOUSTON, TEXAS 77002
(713) 237-9034
TELECOPIER: (713) 237-1216

VIRGINIA OFFICES

8280 GREENSBORO DRIVE
MCLEAN, VIRGINIA 22102
(703) 749-6000
TELECOPIER: (703) 749-6027
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(703) 591-2883
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OF COUNSEL

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JAMES K. JACKSONLOUIS F. BESIO
VICE PRESIDENT FOR
FINANCE AND ADMINISTRATION
WRITER'S DIRECT DIAL NUMBER

September 10, 1992

(202) 371-6060

ORIGINAL
FILEMs. Donna R. Searcy
Secretary
Federal Communications Commission
1919 M Street, N.W.
Room 222
Washington, D.C. 20554Re: ET Docket No. 92-9; Ex-Parte Written Presentation

Dear Ms. Searcy:

This is to notify you, pursuant to Section 1.1206(a)(1) of the Commission's rules, that a written presentation was made today to the staff of Commissioner Barrett with respect to the above-referenced docket, on behalf of the Large Public Power Council (LPPC) and the Association of American Railroads (AAR). Two copies of the presentation, together with two copies of the accompanying transmittal letter, are enclosed.

Very truly yours,



Thomas J. Keller

cc: Byron F. Marchant, Esq.

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ROBERT G. VARNER, JR.
KENNETH S. BARR

SUITE 700
901-15TH STREET, N.W.
WASHINGTON, D.C. 20005-2301
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5280 GREENSBORO DRIVE
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JOHN A. ORDWAY, JR.
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OF COUNSEL

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GENE R. SCHLEPPENBACH*
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* ADMITTED IN TEXAS

LOUIS F. BESIO
VICE PRESIDENT FOR
FINANCE AND ADMINISTRATION

WRITER'S DIRECT DIAL NUMBER
(202) 371-6098

September 10, 1992

HAND DELIVERED

Byron Marchant, Esq.
Federal Communications Commission
1919 M Street, N.W. - Room 844
Washington, D.C. 20554

Re: ET Docket No. 92-9

Dear Byron:

Thank you again for taking the time to meet with us yesterday afternoon. Per your request, I enclose information compiled by fixed microwave users which sets forth estimates of the cost of relocating their operations from the 2 GHz band. I trust that the foregoing is helpful. Let me know if we might provide any additional information.

Yours truly,



William E. Kennard

Enclosures

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BASIS FOR IMPACT/COST ESTIMATES

FEDERAL COMMUNICATIONS COMMISSION
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I. UTC's Executive Summary Contains the Statement That:

[T]he loss of the 2 GHz band would cost utilities, alone, close to \$800 million in equipment purchases and operational transition costs.

II. Basis for Cost Estimates:

- A. In a 1990 UTC survey of electric, gas and water utilities operating stations in the 1.85-2.20 GHz band, each licensee was asked:

If you could no longer use the 1.8 or 2.1 GHz bands, what would be the total cost (for engineering, installation, site acquisition, equipment, etc.) to install replacement facilities or to obtain substitute service?

- B. 142 utilities responded to the survey, collectively operating about 2,600 microwave stations in this band:
1. Aggregate cost for these survey respondents to replace their stations with other facilities or services -- about \$577 million.
 2. Average per station relocation cost -- about \$220,000.
- C. Based on UTC's review of FCC licensing records, there are about 3,700 utility-owned microwave stations in the 1.85-2.20 GHz band.
- D. Therefore, the total cost to relocate all utility-owned microwave stations would be over \$800 million (i.e., \$220,000 x 3,700).
- E. With over 29,000 microwave stations licensed in the 1.85-2.20 GHz band, the cost to relocate all users from the band would be well over \$5 billion.
- F. See reverse for state by state relocation costs¹

¹ Since this cost analysis was compiled the FCC has indicated that the broadcasters licensed in the 2 GHz band will be exempted. The broadcasters estimate that their cost to relocate would have been \$90 million. Thus, the total of all combined state costs should be reduced by \$90 million.

COST TO RELOCATE 2 GHz MICROWAVE STATIONS

STATE	NUMBER OF STATIONS	COST TO RELOCATE
Alabama	323	\$65 Million
Alaska	322	\$64 Million
Arizona	561	\$112 Million
Arkansas	364	\$73 Million
California	2,241	\$448 Million
Colorado	629	\$126 Million
Connecticut	93	\$19 Million
Delaware	21	\$4 Million
District of Columbia	31	\$6 Million
Florida	950	\$170 Million
Georgia	443	\$89 Million
Hawaii	158	\$32 Million
Idaho	241	\$48 Million
Illinois	534	\$107 Million
Indiana	310	\$62 Million
Iowa	275	\$55 Million
Kansas	275	\$55 Million
Kentucky	369	\$74 Million
Louisiana	754	\$151 Million
Maine	93	\$19 Million
Maryland	172	\$34 Million
Massachusetts	136	\$27 Million
Michigan	282	\$56 Million
Minnesota	392	\$78 Million
Mississippi	165	\$33 Million
Missouri	505	\$101 Million
Montana	238	\$48 Million
Nebraska	295	\$59 Million
Nevada	384	\$77 Million
New Hampshire	64	\$13 Million
New Jersey	100	\$20 Million
New Mexico	600	\$120 Million
New York	655	\$131 Million
North Carolina	349	\$70 Million
North Dakota	173	\$35 Million
Ohio	430	\$86 Million
Oklahoma	318	\$64 Million
Oregon	414	\$83 Million
Pennsylvania	676	\$135 Million
Rhode Island	44	\$9 Million
South Carolina	198	\$40 Million
South Dakota	159	\$32 Million
Tennessee	257	\$51 Million
Texas	2,215	\$443 Million
Utah	400	\$80 Million
Vermont	46	\$9 Million
Virginia	411	\$82 Million
Washington	568	\$114 Million
West Virginia	146	\$29 Million
Wisconsin	348	\$70 Million
Wyoming	354	\$71 Million

APS **ORIGINAL**
Arizona Public Service Company
P. O. BOX 53999 - PHOENIX, ARIZONA 85072-3999

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FEDERAL COMMUNICATIONS COMMISSION
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92-7320-013

May 14, 1992

Ms. Donna R. Searcy
Secretary
Federal Communications Commission
1919 M Street, N.W., Room 222
Washington, D.C. 20554

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MAIL BRANCH

Dear Ms. Searcy:

RE: ET Docket No. 92-9

Arizona Public Service hereby submits comments regarding the Federal Communication Commission's response to the spectrum reserve NPRM in ET Docket No. 92-9.

Arizona Public Service is a \$6.5 billion electric utility serving the state of Arizona. Our power grid interconnects to all the utilities in the state and to utilities in California, Nevada, Utah and New Mexico. We are the operating agent and part owner of the largest western hemisphere nuclear generating station and numerous coal/gas generating stations and serve over 600,000 residential and commercial customers.

An extremely reliable communication system is necessary to protect and control our power grid and generating stations. Arizona Public Service has installed 166 microwave terminals throughout Arizona providing this communication system. Our microwave system also interconnects to other utilities to regulate control and protect the power grid. For example, Arizona Public Service receives a trip signal from Bonneville Power in Washington during certain power system conditions. If this trip signal is not received, a chain of events begins which, numerous times in the past, has caused collapse of the power grid in the western half of the United States and hundreds of thousands of customers were without power for hours. We receive a similar trip signal from Pacific Gas and Electric with similar results. Arizona Public Service depends heavily on its microwave communications and any disruptions or interference could cause serious consequences to the western United States power grid.

Eighty percent of the microwave terminals use 1850-2200 MHz frequency (2 GHz). We have 18 transmitters whose path exceeds 70 miles and two transmitters whose path exceeds 118 miles. Two GHz was selected on these paths for its long distance capability and relative immunity to fade from rain when compared to other frequencies. This system is extremely critical to our operations.

We object to moving off the 2 GHz spectrum as defined in the NPRM. We do not believe we will have adequate reliability with alternate media or higher microwave spectrum. Alternate media such as satellite and common carrier are unusable for power system protection because of transmission delay time and poor reliability. Fiber optics has to be installed on the same towers of the power line we would be trying to protect and the loss of a tower would fail the fiber optics at the time it is needed the most. If there is a need for utilities to move off of the reliable 1.85 to 2.20 GHz spectrum, then the 1.71 to 1.85 GHz spectrum should be made available to us when it is released by the government. This would provide reliable spectrum and reduce transition cost to the utilities.

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Ms. Donna R. Searcy
Federal Communications Commission

2

We also must obtain adequate compensation for moving from the 2 GHz spectrum. We ask that our customers not have to subsidize emerging technologies by having to pay to change our communication media. The NPRM does not provide us adequate leverage to acquire compensation for moving off of the spectrum. The cost to relocate referred to in the FCC Office of Engineering and Technology study is over two billion dollars, and is estimated at more than four billion dollars by the UTC. In addition, I seriously doubt there is enough trained engineers and construction forces available to replace all of the 2 GHz systems in 3-10 years. Our limited human resources at Arizona Public Service would require that we contract most of the spectrum relocate work and I have not seen significant contract talent available to meet an industry demand of this magnitude. I also doubt there is enough manufacturing capability to build all the microwave terminals and antennas needed to accomplish this feat. We have estimated the capital cost to relocate Arizona Public Service from the 2 GHz spectrum at \$90 million. Additional operations and maintenance expenses of the systems we would move to are not included in this cost.

We are opposed to the licensing of additions or major modifications to existing 2 GHz systems on a secondary basis and are opposed to automatically becoming a secondary user at the end of 10 or 15 years. Any interference would then be ours to correct rather than who caused the interference or we would have to cease operation. The reliability and availability of a microwave system on a secondary license would not be acceptable to the utility industry. Also, it is doubtful that manufacturers would see much future in making equipment for a secondary market and would discontinue manufacturing the equipment. To continue operating on a secondary license in the rural areas would also be unacceptable because of potential interference from emerging technologies resulting in improper operation of our power system protection.

We are not opposed to the concept of providing spectrum for emerging technologies, but *we are opposed to relocating incumbent core businesses*, such as utilities to new spectrum for the benefit of a speculative new business (PCN) that does not even provide for the basic needs of the general public. However, should the Federal Communications Commission decide that relocation is necessary, then existing users should not be forced to relocate from the 1850-2200 MHz band until the following has been satisfied:

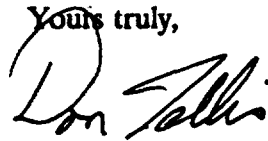
- 1) There is adequate replacement spectrum made available in close proximity to the 1850-2200 MHz band. (If adjacent spectrum is available, why not put PCN on it?)
- 2) Adequate time is allowed to construct replacement facilities.
- 3) Existing systems not be shut down and frequencies released to PCN until the new systems are in place and working reliably.
- 4) The cost for any relocation to new microwave spectrum or new fiber optic technology, at equal or better reliability, be paid for by the PCN licensee and not by our customers or shareholders. Any compensation for relocation of existing users should be arrived at through negotiations between the existing users and the PCN licensee, with compensation in advance of engineering and construction.

**Ms. Donna R. Searcy
Federal Communications Commission**

3

- 5) **Utilities continue as a primary user of the frequencies until there is demand for the frequency and a negotiated agreement between the utility and the PCN completed; that is, no 10-15 year limit to primary user status for utilities.**

Yours truly,



**Don O. Tellis, Manager
Communication Systems**

/jh

**c: Robbie Aiken/Pinnacle West
Walt Ekstrom/APS
Ed Rissing/EEI
Jeffrey Sheldon/UTC
Tom Thompson/APS
Paul McCurley/EEI**

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

ORIGINAL
FILE

In the matter of

Redevelopment of Spectrum to
Encourage Innovation in the
Use of New Telecommunications
Technologies

ET Docket No. 92-9

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

To: The Commission

COMMENTS OF THE
AMERICAN PUBLIC POWER ASSOCIATION

AMERICAN PUBLIC POWER ASSOCIATION
2301 M Street, NW
Suite 300
Washington, DC 20037

202/467-2900

June 8, 1992

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Angeles can support 546 transmitters in the 6525 MHz band per block, any 2-degree block in any MSA in the country can support at least 500 transmitters in the 6525 GHz band. This is a very big assumption on which to base the reliability of the nation's entire electricity infrastructure -- an assumption which APPA is not willing to make.

However, even if one accepts this questionable theory, the study's own numbers show inadequate capacity in the only acceptable alternative band in at least 12 cities. As previously established, use of common carrier microwave is not an acceptable substitute for 2 GHz private microwave systems, and the NPRM did not address entry of private microwave facilities into the 4 GHz and 6 GHz common carrier microwave bands. If all 2 GHz systems were to be relocated to the 6 GHz private microwave band, there would actually be a shortage of channels in the New York City, Houston, Sacramento, Washington, Dallas-Fort Worth, Baltimore, San Francisco, New Orleans, Los Angeles, Pittsburgh, Philadelphia, and Chicago MSAs.⁶

4. Switching to Higher Frequencies Would be Costly

APPA's survey confirmed that conversion of the existing 2 GHz systems to higher frequencies would be expensive. Twenty-one respondents estimated it would cost a total of \$79 million to convert their systems to higher frequencies. Several APPA members were unable to estimate their cost of conversion.

^{6/} Derived by comparing the number of transmitters in the 2 GHz band with the available capacity in the 6525 MHz band, as listed in Table 4 of the OET Study, pp. 26-27.

The OET Study concluded that the cost of relocating all 2 GHz microwave facilities to frequencies above 3 GHz would range from \$750 million (if conversion did not occur until existing equipment had totally depreciated) to \$2.75 billion (if all existing 2 GHz microwave facilities were converted to higher frequencies immediately). Again, these estimates are based on some questionable assumptions. First, they assume that the useful life of "frequency sensitive" 2 GHz equipment is 15 years, when the study showed that some existing equipment is already as much as 20 years old. Second, they assume that the value of the equipment should be reduced to reflect the portion of its useful life still remaining. Third, they assume this equipment is equally distributed over its 15-year life cycle, and that the average age of the equipment is, therefore, 7.5 years. Fourth, they assume the lower estimate of \$125,000 for replacement of frequency sensitive equipment at each facility, rather than the higher estimate of \$150,000 or even an average of this range. Finally, they assume that the average costs per facility of frequency coordination, antenna upgrades, improvements to antenna structures, and other relocation costs would be \$25,000, when figures reported in the OET Study showed these costs could range as high as \$53,000 per site.⁷ If any one of these five assumptions is incorrect, the estimated costs could be grossly understated.

This estimate is far below that supplied by the Office of Management and Budget (OMB). The Administration's FY 1992 budget assumed net receipt of \$2.5 billion from the auction of 30 MHz of Federal spectrum controlled by the National Telecommunications and Information Administration (NTIA). These net receipts were based on OMB's estimate

that it would cost \$67 million per MHz to relocate existing users of the spectrum to other frequencies.⁸ Using the OMB estimate, it would cost \$14.74 billion to reallocate 220 MHz of the 2 GHz spectrum.

5. Converting to Higher Frequencies Would Be Impractical in Many Instances

The NPRM suggests that it is technically feasible for incumbent 2 GHz licensees to relocate to higher frequencies. The Commission based this conclusion on the OET Spectrum Study. However, this conclusion is fatally flawed for several reasons.

First, while acknowledging that 2 GHz systems are capable of supporting longer path lengths than higher frequencies, the study found that the average 2 GHz path length was about the same as the average path length of 6 GHz systems. Thus, the study concluded, 2 GHz systems could convert to the 6 GHz band with minimal technical difficulties.

The shortcoming in this analysis is that it relies on averages. The OET Study notes that, while the average path of a 2 GHz system is 17 miles, individual path links range from less than one mile to more than 100 miles.⁹ No one would seriously suggest that a 6 GHz system could support a path length in excess of 100 miles. Consequently, while the 6

7/ OET/TS 92-1, pp. 31-33.

8/ See "Auctioning Radio Spectrum Licenses," Congressional Budget Office (March, 1992), p. 14.

9/ OET/TS 92-1, pp. 9 and 18.

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Before the
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Washington, D.C. 20554

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of)
)
Redevelopment of Spectrum to) ET Docket No. 92-9
Encourage Innovation in the)
Use of New Telecommunications)
Technologies)

To: The Commission

COMMENTS OF THE ASSOCIATION
OF AMERICAN RAILROADS

Thomas J. Keller
Erwin G. Krasnow
Lawrence R. Sidman
Jacqueline R. Kinney

VERNER, LIIPFERT, BERNHARD,
McPHERSON AND HAND, CHARTERED
901 15th Street, N.W.
Suite 700
Washington, D.C. 20005
(202) 371-6060

Its Attorneys

June 8, 1992

The suggestion in the OET Report that displaced 2 GHz microwave users convert to satellite technology also is without merit. Although railroads currently are using certain types of satellite technology for certain applications (e.g., Global Position System ("GPS") for locomotive and vehicle positioning and engineering right-of-way surveying; and receive-only satellite weather information), studies by individual railroads have concluded that satellite technology as a replacement medium for delivering voice and data services to and from trackside sites throughout the rail network is not technologically or economically feasible.

**C. The Commission Has Underestimated The Cost Of
Converting To Alternative Frequencies and Media.**

The OET Report concluded that the average cost per facility of changing from 2 GHz to 6 GHz, assuming the change occurred at the end of the useful life of the "frequency sensitive" equipment, would be only \$25,000. In the experience of AAR's members, this figure is unrealistically low. A more accurate incremental cost would be in the range of \$150,000 to \$175,000, more than six to seven times the amount estimated by the Commission's staff. The electronics alone account for an additional \$58,000, consisting of an additional \$50,000 in the transmitter, \$2,000 per microwave site in training costs, \$5,000 per site for new test equipment and \$1,000 per site in documentation expense.

Similarly, the Commission's estimate for ancillary replacement costs was unreasonably low. The OET Report includes an estimate of \$15,000 per site for antenna and transmission line upgrade per site. The more accurate figure, however, is approximately four times that estimate. Generally, in the 6 GHz band there are four antennas per site in order to accommodate space diversity to account for fading, bringing the figure for this category to \$60,000. Furthermore, as a general rule, most towers designed for 2 GHz equipment will require structural improvement to handle the higher antenna loading. In this regard, structural improvements on the order of \$40,000 per tower are not uncommon, and structural engineering costs typically amount to approximately \$2,000. In addition, new path engineering costs, typically \$4,000, must be included in the estimate. Finally, it is estimated that one path in five will require additional land to accommodate the structural work or a larger tower, which would average about \$10,000 per site.

The following is a summary of the costs described above:

Cost to Convert from 2 GHz to 6 GHz Band

<u>Item</u>	<u>Costs</u>
Equipment	\$ 58,000 (over like for like replacement costs)
<u>Path</u>	
Frequency Coordination	1,500
Antenna Upgrade/Repeater	60,000
Structural Improvements	40,000
Structural Engineering	2,000
Path Engineering	4,000
Land Acquisition 1 for 5	<u>10,000</u>
Total	\$175,500

Importantly, the foregoing estimates do not include the additional costs that would be incurred in the event it were necessary to convert from analog to digital systems, nor do they include the cost of new intermediate microwave repeaters that would have to be "dropped in" on links where the longer path links possible at 2 GHz would not be possible at 6 GHz.

V. DISPLACED INCUMBENTS OF THE COMMERCIAL 2 GHZ BAND MUST BE GUARANTEED AN ADEQUATE RELOCATION BAND AND FULL COMPENSATION.

Even if alternative frequencies or media were available and sufficiently reliable to accommodate fixed microwave users of the Commercial 2 GHz Band, the Commission still must show that displaced licensees will not bear the cost of vacating the band for PCS and other emerging technologies. The Commission stated that it intends to minimize the "significant costs" relocation will entail by permitting new technology entrants to pay them.^{67/}

^{67/} The Commission's proposal to provide for recompense to displaced users should not be viewed as an act of magnanimity. Displacement of existing 2 GHz licensees without proper compensation may very well, under certain circumstances, constitute an unlawful taking of property in violation of the Fifth Amendment. Although the Communications Act does not bestow on any licensee a vested right in retention of its license (see Victor Broadcasting, Inc. v. FCC, 722 F.2d 756 (D.C. Cir. 1983); FCC v. Sanders Brothers Radio Station, 309 U.S. 470, 474 (1940), courts recently have given increasing weight to the constitutional rights of property owners in the face of governmental actions resulting in the reduction of property value. Thus, when governmental action extinguishes a "fundamental attribute of ownership," there may be a "taking" for purposes of the Fifth Amendment. Agins v. City of Tiburon, (continued...)